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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,753	07/20/2006	Catherine Daines	4195-033	2835
24112 7590 01/21/2009 COATS & BENNETT, PLLC 1400 Crescent Green, Suite 300 Cary, NC 27518				
EXAMINER				
STELLING, LUCAS A				
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1797				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/577,753

Applicant(s)

DAINES ET AL.

Examiner

Lucas Stelling

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-42, 44-50 and 53-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27-42, 44-50 and 53-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/808)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Supplemental Amendment

1. Applicant's provisional amendment of 11-06-08 appears to overcome the issues raised in the notice of non-responsive amendment, and it has been entered. Applicant's arguments of 11-06-08 in opposition of election by original presentation of the counter-current flow reactor have been considered but are not persuasive. The successive presentation of mutually exclusive species presents an examination burden because a different field of search would be required. The determination made in the notice of non-responsive amendment of 10-06-08 concerning election by original presentation is still deemed proper and therefore made FINAL.

Specification

2. The amendments to the abstract and specification filed 11-06-08 and 7-29-08 are objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: There is no clear support for a concurrent flow or "absorbent" in the originally filed English disclosure.

3. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 27, 28, 33, 34, 38-40, 42, 44, 47-50 and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote in view of Bybel.

6. As to claim 27, 28, 33, 34 and 40, Cote teaches a method of treating an aqueous influent (**Cote title and abstract, fluid is “water”**) containing organic matter in a single chamber reactor having an immersed membrane filtration unit and a bed of catalyst material disposed in the reactor, the method comprising:

- a. directing the influent into the reactor (**Cote col. 9 lines 21-22**);
- b. injecting an oxidizing gas into the reactor containing influent (**Cote col. 11 lines 40-47 and see Fig 7**) ;
- c. directing influent through the bed of catalyst material and forming treated water, wherein the catalyst material promotes oxidation reaction of organic material in the influent, or promotes the absorption of organic material by the bed of catalyst material (**Cote col. 7 lines 1-5; the catalyst material is activated carbon and is in the treatment chamber**);
- d. Filtering at least one portion of the treated water in an immersed membrane filtration unit and forming a filtered effluent (**Cote col. 9 lines 27-50, water if filtered in the modules, See also Figs 5-6B, water enters at the lower open worked section 8 is drafted up by the current of the ozone bubbles, and a part of the water will exit through the open worked sections at the top 8a or 8b**);
- e. bypassing the immersed membrane filtration unit with at least a second portion of the treated water such that the second portion of the treated water is non-permeated treated water (**Cote See also Figs 5-6B, water enters at the lower open**

worked section 8 is drafted up by the current of the ozone bubbles, and a part of the water will exit through the open worked sections at the top 8a or 8b the part which exits through the top open worked section is the non-permeated treated water);

f. directing the filtered effluent from the reactor (**Cote col. 9 lines 5-20 and see Fig. 7, permeate is removed from the chamber through a recover means 7);**

g. recirculating at least a portion of the non-permeated treated water from the reactor, through a recirculation line and back into the reactor (**Cote 20 Fig. 7 non permeated water is recirculated through a recirculation line); and**

7. Cote is different from claim 27 in that recirculating oxidizing gas from the reactor through a gas recirculation loop and back to the reactor is not discussed, instead Cote collects and destroys residual ozone (**Cote col. 9 lines 1-5**). Bybel teaches the recovery and reuse of ozone in a water treatment system (**Bybel See Fig. 1, and col. 3 lines 15-25**). It would have been obvious to a person of ordinary skill in the art at the time of invention to reuse the unreacted ozone gas in order to conserve power needed to produce ozone.

bed of catalyst material (**activated carbon absorbs organic material**).

8. As to claim 38, Cote teaches that the membrane filtration unit are ozone-resistant organic membranes like PVDF or PTFE (**col. 4 lines 50-55**).

9. As to claim 39, these limitations are an inherent property of the device used in the method of Cote.

10. As to claim 42, Cote teaches recirculation of the permeate, or treated water back into the treatment chamber **(col. 9 lines 10-20)**.
11. As to claim 44, Cote uses a column formation **(See Fig. 6)**.
12. As to claims 47-49, Cote uses a pump with pressure of 0.2 -- 0.8 bars to remove the permeate, or treated water from the treatment chamber, and thereby draw it through the membranes **(col. 9 lines 40-50)**.
13. As to claim 50, Cote teaches A system for treating an aqueous influent containing organic matter comprising:
 - a. a single chamber reactor **(Cote 2)** having an inlet **(Cote 4)** through which the aqueous influent passes into the reactor;
 - b. a catalyst material **(Cote col. 7 lines 1-5; the catalyst material is activated carbon and is in the treatment chamber)** disposed in the reactor;
 - c. a membrane filtration **(Cote 31)** system disposed in the reactor;
 - d. an oxidizing gas inlet **(Cote 6)** disposed in the reactor for directing an oxidizing gas into the reactor;
 - e. a recirculation line **(Cote 20, See Fig. 7)**;
 - g. wherein the oxidizing gas inlet is arranged in the reactor such that the oxidizing gas inlet directs an oxidizing gas therefrom and into the reactor and through the aqueous influent in the reactor **(See Figs. 5 and 6, ozone is col. 9 lines 20-35, ozone is injected into the water to be treated and filtered)**.

14. Cote is different from claim 50 in that a gas recirculation line is not taught, and Cote does not specify the relative physical locations of the carbon catalyst with respect to the membrane filtration units.

15. As to the gas recirculation line, Bybel teaches the recovery and reuse of ozone in a water treatment system (**Bybel See Fig. 1, and col. 3 lines 15-25**). It would have been obvious to a person of ordinary skill in the art at the time of invention to reuse the unreacted ozone gas in order to conserve power needed to produce ozone.

16. As to the relative locations of the carbon catalyst and the membranes within the reactor, this does not appear to be particularly critical to the function of the device because applicant intends for water to enter the chamber and interact with the catalyst and ozone before being filtered; and the catalyst and membrane are located close enough such that a portion of the catalyst forms on the surface of the membrane unit (**See instant application claim 39**). Cote functions in substantially the same way with the water to be treated entering the reactor and contacting the catalyst and ozone before being filtered. See MPEP 2144.04(VI)(C) *moving the location of a switch was held unpatentable because the change in location does not modify the operation of the device, In re Japiske*.

17. As to claim 53, Cote uses a column formation (**See Fig. 6**).

18. As to claims 54-55, Cote uses a powdered activated carbon (**col. 7 lines 1-5; activated carbon has the capacity to absorb organic materials**).

19. Claims 29, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote and Bybel as applied to claims 27 and 28 in further view of U.S. Patent No. 4,795,735 to Liu et al. ("Liu").

20. As to claim 29, Cote as modified by Bybel teaches the method of claim 28, but does not teach that the solid mineral is doped with a metallic substance. Liu teaches the use of an activated carbon/alumina composition for removal of organic pollutants and ammonia (**Liu abstract and col. 1 lines 15-35**). Liu teaches that the addition of alumina allows for the absorption of polar and inorganic pollutants without shortening the service life of the all-carbon absorber (**Liu col. 1 lines 15-35**). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to use alumina doped activated carbon instead of the activated carbon in Cote in order to increase the ability to absorb polar and inorganic pollutants and thereby extend its service life.

21. As to claims 31, and 32, Cote teaches the method of claim 27, but is silent as to the size of the activated carbon granules used. Liu teaches using a composition with 80 to 600 mesh (**Liu col. 2 lines 55-65**) which is approximately 30-180 μ m grating size. It is within the understanding of a person of ordinary skill in the art to use a fine mesh size in order to maximize the surface area of the catalyst material, however, Cote confines the treatment material to the treatment chamber, so the particle size must be larger than the pore size of the membrane filter in Cote. It is within the skill of a person of ordinary skill in the art to optimize the mesh size of the catalyst in order to maximize the reactive surface area and to ensure it is not transported through the filter. Therefore, it would

have been obvious to a person of ordinary skill in the art at the time of invention to provide catalyst particles in the size of 10 μ m – 40 μ m in order to maximize the reactive surface area and to confine the particles to the treatment chamber.

22. Claims 30, 41, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote, Bybel, and Liu as applied to claims 27, 29 and 50 above and in further view of U.S. Patent Application Publication No. 2001/0022290 to Shiota et al. ("Shiota").

23. As to claim 30 and 56, Cote, Bybel and Liu teaches the method of claim 29 and Cote and Bybel teach the system of claim 50, respectively, but is silent as to whether the catalyst forms into a fluidized bed. Shiota teaches that the use of a fluidized bed form in the catalytic reactor reduces the possibility of generating a hotspot, and also uniformly degrades the catalyst material (**Shiota [0111]**). Therefore it would have been obvious to a person of ordinary skill in the art at the time of invention to use a fluidized catalyst bed in the method of Cote in order to prevent hotspots and to allow for uniform degradation of the catalyst.

24. As to claim 41, Cote and Bybel teaches the method of claim 27 but does not teach introducing H₂O₂ into the reactor. Shiota teaches using peroxide as an activated carbon catalyst oxidation treatment in order to increase the carbon catalytic activity in the presence of inorganic contaminants (**Shiota [0060] and [0063]**). Therefore it would have been obvious to a person of ordinary skill in the art at the time of invention to

further add peroxide to the reactor in Cote in order to increase the catalytic activity of the activated carbon in the presence of inorganic contaminants.

25. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote and Bybel as applied to claim 27 above and in further view of U.S. Patent No. 5,372,723 to de Geus et al. ("de Geus").

26. As to claims 35 and 36, Cote as modified by Bybel teaches the device of claim 27, but teaches that the filtration membranes are microfiltration membranes.

Nanofiltration and ultrafiltration, as well as reverse osmosis, are substitutional equivalents in the field of water filtration when minute particles are to be removed (**de Geus abstract**). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to substitute the microfiltration membrane of Cote with either a nanofiltration or ultrafiltration membrane in order to remove particulates of a particular minute size. See also MPEP 2144.06 (II).

27. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cote and Bybel as applied to claim 27 above and in further view of U.S. Patent No. 4,081,365 to White et al. ("White").

28. As to claim 37, Cote teaches the method of claim 27 but does not teach the use of a mineral filtration unit. White teaches the use of a mineral filtration unit in association with an activated carbon bed (**White col. 3 lines 1-10**). It is within the understanding of a person of ordinary skill in the art, and conventional to use a mineral

filtration unit to adjust the mineral content of an effluent and to remove certain inorganic material. Therefore it would have been obvious to a person of ordinary skill in the art at the time of invention to further provide a mineral filtration unit in the device used in the method of Cote in order to adjust the mineral content and remove inorganic material.

29. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote. And Bybel

30. As to claims 45 and 46, Cote teaches the method of claim 27 but is silent as to the length of time the effluent is reacted in the ozone reaction chamber. It is within the understanding of a person of ordinary skill in the art that contact time with a catalyst is a result effective variable, based on the reactivity of the catalyst and the concentration of the constituents to be reacted. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to optimize the dwell time of the effluent with that catalyst in Cote in order to fully oxidize all of the contaminants.

31. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cote, Bybel and Shiota as applied to claim 56 above, and further in view of Liu.

As to claim 57, Cote as modified by Shiota teaches the system of claim 56, but is silent as to the mesh size of the paricles. Liu teaches using a composition with 80 to 600 mesh (**Liu col. 2 lines 55-65**) which is approximately 30-180 μ m grating size. It is within the understanding of a person of ordinary skill in the art to use a fine mesh size in order to maximize the surface area of the catalyst material. Therefore, it would have been

obvious to a person of ordinary skill in the art at the time of invention to provide catalyst particles sized under 100 μ m in order to maximize the reactive surface area.

Response to Arguments

32. Applicant's arguments filed 11-06-08 have been fully considered but they are not persuasive.

33. Applicant argues that amending the specification and abstract is proper because the foreign language filing provides support. In response, an accurate translation is a requirement under 35 USC 371, and the translation may not be changed without a request for a corrected translation filed with the PCT Legal Department¹. The procedure which Applicant points out for cases filed under 37 CFR 1.52(d), see MPEP 2163.07(a) does not apply to cases filed under 35 USC 371. Therefore, the rejection and objections to Applicant's amendments will not be withdrawn without an approved request for corrected translation.

34. Applicant argues that Cote does not teach recirculating the non-permeated treated water or a recirculation line capable of such. Applicant's attention is directed to Fig 7 which shows a recirculation line (**Cote 20 Fig. 7**).

35. Applicant also argues that claim 27, 28, 33, 34, 38-40, 42, and 44, and 47-50 should not be rejected under section 102 for at least the reason that a gas recirculation line is not shown. These arguments are moot in view of the new grounds of rejection.

¹ PCT Help Desk – phone: 571-272-4300, hours: 9:00AM - 4:30PM

Conclusion

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucas Stelling whose telephone number is (571)270-3725. The examiner can normally be reached on Monday through Thursday 12:00PM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

las 1-14-09

/Matthew O Savage/
Primary Examiner, Art Unit 1797